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# THE USE OF LANDSAT DATA IN AN OPERATIONAL FOREST RESOURCE INFORMATION SYSTEM (FRIS)

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ABSTRACT IN LIEU OF MANUSCRIPT

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The recent implementation of the Forest Resource Information System has provided the capability of combining classifications of Landsat data with graphical and tabular data in an operational data base system for use in forest management. Landsat data is in gridded format and is not compatible with map or graphical information which is in polygon and line format. In this system, the gridded Landsat classifications are converted to polygons and added to the data base as another layer of information.

Classifications are created with a modified LARSYS software package which has been installed at the corporate national computer facility in Dallas, Texas, via a remote terminal in Jacksonville, Florida. Training sets for the classifier are derived from the clustering algorithm in the LARSYS package, and the training areas are selected from data presented in false color on an image display. Whenever possible, the training sets are created by personnel familiar with the area to be classified. The map information, such as roads and streams, stored in the data base can be superimposed on the Landsat data to facilitate geographic location within the scene. This added information allows the analyst to quickly identify cover types defined by the clustering algorithm and aids in creating a more accurate training set.

Before the classification is converted to polygon (vector) format, it is processed with a smoothing algorithm to reduce the number of single and double pixels classified differently from their neighbors. Subclasses are grouped together to form a smaller set of informational classes. These post-classification procedures reduce the number of polygons required to convert from grid to vector format and simplify comparison to data base maps. The resulting polygon maps are registered to the data base after first locating common checkpoints in the data and on the maps using software supplied with the data base. Once the classification is in the system as an additional layer of information, it can be used with any other level of information such as the forest type maps and the tabular information. Additional maps showing areas of disagreement can be generated. These maps may be produced as hard copy drawings on a plotter or viewed in color on the image display along with additional geographic information which may include ownership boundaries, roads, streams, and survey information.

The system has been used to display Landsat data and classifications from 1973 to the present. Striking changes in cover types may be seen in these presentations, and such information can be useful in evaluating past management practices.

Since the company is interested in the production of southern pine, most of the data processed has been collected in the winter season when most hardwoods are in the leaf-off condition. Identification of pine stands is felt to be easier without the effect of hardwood foliage complicating the analysis process. One problem peculiar to the winter data has been found. Stands of pine which have been control burned as part of the normal management practice are frequently misclassified into the hardwood class. This effect has been observed even though the pine stand may have almost total crown closure, and the tree crowns show no visible changes due to the fire. The reason for this is not well understood, but a lingering physiological stress caused by the fire may result in a lowered reflectance in the infrared portion of the spectrum. Examples showing these burned areas are included with other samples illustrating the use of the information system.